Land-use Transport Systems: Comparing Local Policy Dynamics in Swiss and French Urban Areas

Caroline Gallez, Christophe Guerrinha, Vincent Kaufmann, Hanja-Niriana Maksim, Mariane Thébert

LAND-USE TRANSPORT SYSTEMS: COMPARING LOCAL POLICY DYNAMICS IN SWISS AND FRENCH URBAN AREAS

GALLEZ Caroline, Université Paris-Est, LVMT, caroline.gallez@inrets.fr

GUERRINHA Christophe, Conseil Régional Languedoc-Roussillon, christophe.guerrinha@gmail.com

KAUFMANN Vincent, EPLF, LaSUR, vincent.kaufmann@epfl.ch

MAKSIM Hanja, EPLF, LaSUR, hanja.maksim@epfl.ch

THEBERT Mariane, Université Paris-Est, LVMT, marianne.thebert@enpc.fr

ABSTRACT

Since the 19th century, a variety of “ideal” land-use transport systems have been formulated as optimal solutions to urban land-use and transportation problems (Wegener and Fürst, 1999). Today, there is a broad consensus among researchers and transport/urban planning professionals that more coherence and coordination between transport and land-use policies is necessary to achieve sustainable urban development and mobility. This claim derives from evidence that, in Europe, local policies are only successful as regards criteria for sustainable development (the reduction of motorized traffic) when they combine measures for limiting car use in city centres with measures favoring the development of public transportation, densification, and mixed-use urban organization (Pharoah and Appel, 1995; Brög and Erl, 1996). If there is nothing new in the question regarding the interaction between spatial organization and transport, the ideas underlining this concern and the purposes of public policies have deeply evolved over the centuries, particularly as relates to urban planning. In short, we have moved from a concept of “car-shaped cities” to an approach to urban design where guidelines derive from “urbanity” values and the sharing of public spaces.

How have local authorities translated the requirements and objectives of national laws? And how have they accounted for the evolution of these global objectives and the increasingly complex issue of coordinating urban development and transportation? What factors explain innovation and continuity in the relationship between land-use planning and transport policies? In this study we focused on the question of political change by comparing the “trajectories” of four urban areas: Geneva and Bern in Switzerland and Strasbourg and Bordeaux in France.

Many empirical studies in political analysis have emphasized the importance of the long-term in identifying elements of continuity in political processes, assessing the reality of change,

and stressing the interplay between national and local authorities (Fontaine and Hassenteufel, 2002; Kay, 2005). In this work, we have described the "policy paths" of the four aforementioned urban areas since the end of the 1960's by focusing on the contents of master plans, the principal technical solutions and projects that have been implemented, and the means of inter-sectorial coordination used. To do so, we have done a detailed analysis of numerous documents (laws, plans, technical studies, political documents, etc.) as well as semi-directive interviews with local actors. For each case, factors of change or inertia have been identified by focusing on three main variables that are often studied alternatively in public policy analysis: ideas, institutions and interests, or the "Three I's" as termed by Palier and Surel (2005). This paper presents the main results that emerged from a comparative analysis of these local dynamics.
In exploring this first dimension, we have brought into question the influence of ideas, values, and standards on public policy and in the problem of the formulation or choice of solutions. We have shown, for instance, that urban or ecological values do explain differences in the ways of coordinating transport and land-use policies in Switzerland and in France; furthermore, this influence varies between cities based on geographical and "cultural" variables. We then focused on the role of the institutions (i.e. formal organizations) that regulate and structure local political systems. Our empirical observations led us to give less importance to the influence of institutional reform as a means of achieving more integrated policies: although institutions do influence political choices and explain differences among the four cities, we maintain that changing local institutions alone is not in itself an effective means of changing policies. The last variable concerns the interests of actors involved in political processes, as well as their strategic negotiations and interactions. We found that coordination between transport and land-use planning results from conflicts between area-based and reticular approaches to territorial development. Furthermore, we underline the role of economic factors in the negotiations between city centres and the suburbs, specifically in the context of cross-border urban areas (Strasbourg and Geneva).

Keywords: transport and land-use planning coordination; comparative analysis; political change; institutions; ideas; interests

INTRODUCTION

In Europe, the idea that coordinating transportation and urban planning is a necessary condition for setting sustainable urban development into motion has spread throughout academic and professional circles. This idea is largely supported by the observation that the only metropolitan areas which have succeeded in containing automobile use (Bale, Berne, Zurich, Karlsruhe...) are those which combine public transport development with various kinds of automobile use restrictions (notably parking restrictions) as well as urban planning and development measures (proximity-based urbanism, urbanization and densification around public transport stations, etc.)
In the field of urban planning, the question of the relationship between transport networks, the organization of traffic flows, and urban form is certainly not a new one, as shown by the

formalizations elaborated at the end of the 19th century by Haussman and Cerda, and in Madrid urbanist Arturio Soria y Mata's famous linear city project (Ciudad Lineal). However, the issues underlying this problem have changed greatly, as have lifestyles and urban travel in general. Considering just the last forty years, we have gone from a vision where automobile travel had a hegemonic role in the city to one where values of urbanity, road surface sharing, and mixed-use public space serve as the basis for roadway design (Wachter, 2003). In academic debate, questions surrounding the relationship between transport network development, urban growth, and economic development, often evoked in terms of the "structuring effects" of transportation (Offner, 1993), have become both more modest and more ambitious: more modest, in the sense that network development is now considered to be one factor among many in these transformations; more ambitious because we now consider the political regulation of these interactions (Offner and Ollivier-Trigalo, 2000).

Despite a consensus that it is necessary to better coordinate mobility management with the development and organization of urbanized spaces, debate over the objectives and means behind this coordination remains relatively limited. In this research project, we have examined the actors in charge of urban travel and development in several French and Swiss metropolitan areas, and addressed questions about the relationship between the city and transportation over the last forty years (Gallez et Kaufmann, 2010). How has the shift in perspective - from adapting the city to the automobile toward promoting sustainable cities and mobilities - been translated into action? And what of local issues, visions, and coordination practices surrounding transportation and urban planning? What factors favor this kind of integration, and can we identify sources of inertia and causes of public action fragmentation?

To respond to these questions, we have employed diachronic studies of four metropolitan areas: Bern and Geneva in Switzerland, and Strasbourg and Bordeaux in France. In this sample, Berne and Strasbourg serve if not as models, at least as references for the integration of urban planning and travel policy (for the former), and the implementation of multimodal travel policies (for the latter). On the other hand, the dominant role of the car in urban development models has been questioned more recently in Geneva and Bordeaux.

This article is divided into five sections. First, we will briefly present the four study areas, their spatial characteristics, and the quality of their public transport supply. The second section will present our methodology and choice of analytical framework. The three following sections will review the factors of continuity or change identified in the four study cities, from three complementary entry points: institutions, interests, and ideas. Finally, the conclusion will present the principal lessons drawn from this comparative study.

1. A COMPARISON OF THE FOUR STUDY AREAS

Bern, Geneva, Strasbourg, and Bordeaux differ in terms of their geographic location, size, and population distribution, as well as their urban growth patterns and public transport supply. The following factual and descriptive elements should clarify the scope (and limits) of our comparative study.

1.1. Spatial distribution of population

Geographic location and topographic constraints have strongly influenced urban development in these four metropolitan areas.
Bordeaux is situated in the southwest of France, at the mouth of the Garonne river. Other than the presence of large vineyards, which have lead to unequal urbanisation of the river's two banks, there is a lack of topographic constraints to constrain urban development. The urban region[1] of Bordeaux, which had almost one million inhabitants in 2006, is one of the most sprawling in France (table 1).

Table I – Spatial distribution of the population in four urban regions (2006)

	Centre city			Urban region			
	Area (km2)	Population 2006	Density (pers./km2)	Definition of region	Area (km2)	Population 2006	Density (pers./km2)
Bern	52	122 422	2 354	Swiss	481	343 789	715
Geneva	16	185 893	11 618	Swiss	1 042	715 207	686
Strasbourg	78	272 975	3 500	French	965	638 670	662
Bordeaux	45	232 260	5 161	French	2 872	999 152	348

Sources : INSEE (RP) – OFS - Ocstat (Geneva)

With 122,422 inhabitants in the centre and 350,000 in its urban region, Bern is the smallest European capital, and also the smallest of the four cities in our sample. The capital of the Helvetic Confederation has developed in a series of meanders on the Aar River. The historic centre is entirely contained by one of these loops, and access conditions are thus practically those of a peninsula.
Strasbourg and Geneva are cross-border conurbations with very different topographic contexts.
The Strasbourg conurbation is situated in the plain of Alsace, with urbanisation constraints linked to hydrographic conditions and the existence of ancient military roads. The Strasbourg urban region is much less spread out than that of Bordeaux (965 km2 versus 2872 km2), and has just over 612,000 inhabitants. Peripheral urban development is structured around many small towns and cities, and was contained by the presence of vineyards.
The canton of Geneva's territory is both very small (246 km2 without the lake) and almost entirely surrounded by France. This city has developed at the southwest end of Lake Geneva, within a basin surrounded by several mountain ranges, most of which are in France (in the Jura and Haute-Savoie). Using the French definition, the Geneva urban area has a just under 700,000 inhabitants, around 250,000 of whom live in France.
Because of salary and land price differentials between France and Germany (for Strasbourg) and France and Switzerland (for Geneva), national borders have played a very different role

[1] In France, urban regions are defined through a functional approach, using a commuting criterion. The « aire urbaine » includes a primary urban pole (a centre city and its suburbs) with at least 5000 jobs, plus a peri-urban space composed of municipalities where at least 40 percent of the resident active population work in this urban pole. The Swiss and French data are not entirely comparable, because there is no shared definition of the urban region. The Swiss definition is both more restrictive and more complex than the French one. Its criteria are morphological (continuity of built environment, contiguity of municipal borders), functional (commuting), and structural (type of employment, ratio of jobs to workers). The application of both definitions to the same territory, which has been done for the Geneva urban region, shows that the French definition delimits a larger space than the Swiss one, with a comparable population. (Schuler, Perlik, Dessemontet, 2005).

in these two cross-border conurbations. Strasbourg essentially exerts its force of attraction within its own country, whereas most of Geneva's periurban development occurred outside the canton of Geneva, on the French side of the border. Because of this, cross-border flows are much more significant in the Geneva region than in Strasbourg-Ortenau. Movements are primarily centrifugal in the first case (from the Strasbourg region outward) and centripetal in the second (from France or the canton of Vaud toward Geneva).

1.2. Quality and usage of public transport

Table 2 presents some comparative indicators of public transport supply in and around the four urban regions. For the cross-border conurbations, only national data (French for Strasbourg and Swiss for Geneva) were taken into account.

Table 2 - Comparison of public transport supply in four urban regions

	Strasbourg	Bordeaux	Bern	Geneva
Area of urban region	CUS : 305 km2	CUB : 552 km2	VRB : 432 km2	Canton : 246 km2
PT1 supply in conurbation				
Tramway				
Trolleybus and bus	5 lines - 53 km	3 lines - 43,8 km	3 lines - 17 km	6 lines - 18 km
River transport	30 lines	75 lines	19 lines	53 lines
				4 lines
Interurban PT1supply2				
S-Bahn			13 branches	
Regional trains	5 lines	5 lines	10 lines	6 lines (2 intl.)
Interurban bus/coach	16 lines	45 lines	16 lines	11 intl. lines

[1]PT: Public Transport - [2]Excluding school transport.
Sources: CTS (Strasbourg); TBC (Bordeaux); Bermobil, BLS, RBS (Bern); TPG and unofficial TPG site (Geneva); CFF (Bern and Geneva).

The Bordeaux region's bus network is more developed than that of Strasbourg, because of a more extensive Urban Transport Perimeter (PTU). Both tramway networks are inter-municipal, but the Strasbourg network is older and more interconnected. In terms of seat-kilometres, supply is greater in the Alsatian case (5390 in Strasbourg versus 4383 for Bordeaux)[2]. The number of regional train lines is identical in the two metropolitan areas, but quality of service (especially in terms of frequency) is better in Strasbourg.
The principal difference between the two Swiss agglomerations is in rail service, which is more developed in the Bern region. This city possesses a regional express network (S-Bahn) with 13 branches, the second largest such network after that of Zurich.
Table 3 shows differences in public transport and car use in the four urban regions[3].
Car use is more prevalent in the Bordeaux region than in the Strasbourg region. In 1998, almost 66% of daily trips by residents of the Bordeaux Urban Community were by car, versus 53% for the Strasbourg Urban Community residents. Public transport has a smaller market share in Bordeaux than in Strasbourg. The Strasbourg conurbation has relatively strong

[2] Source : Statistical catalog of urban public transport. CERTU-GART-UTP (2006 figures).
[3] This comparison was carried out by our Swiss colleagues in earlier studies, and employs a statistical normalization of the study areas (Jemelin, Kaufmann, Barbey, Klein et Pini, 2007). For the two French agglomerations, these data come from household travel surveys carried out in Strasbourg in 1997 and in Bordeaux in 1998. For Geneva, the canton's statistics were used, and for Bern, a collection of 32 municipalities corresponding roughly to those in the VRB.

bicycle use (around 9% of trips) and a larger share of walking trips (31% in the Strasbourg region versus 21% in the Bordeaux region).

Table 3 – Changes in mode share for daily travel in the four urban regions

	Strasbourg 1997	Bordeaux 1998	Bern 2000	Geneva 2000
Study area characteristics				
Area (km^2)	1 095	1 722	343	246
Number of municipalities	126	96	32	45
Population	602 000	801 000	297 400	413 100
Mode share (% trips)				
Public transport	9.5%	7.2%	20.0%	16.1%
Private car	52.5%	65.7%	36.5%	46.1%

Sources: INSEE (RGP 1990 and 1999) – Household travel surveys for Strasbourg and Bordeaux

Despite a relatively weak regional rail network, public transport's market share in the canton of Geneva is 16%, within a territory that is clearly smaller than that of the two French cities. Around 20% of trips are carried out by public transport in the Bern region, over an area somewhat larger than the canton of Bern. Use of the private car is also much more moderate in Bern (36.5%) than in Strasbourg or Bordeaux, and is significantly below that in the canton of Geneva (46% of trips).

2. METHOD: CHOICE OF ANALYTIC FRAMEWORK

Switzerland is one of the European countries which, in a few urban areas over the last thirty years or so, have practiced action strategies coordinating transportation and urban planning. In Basel, Bern, and Zurich, these policies seek to reduce urban automobile use by increasing public transport supply while structuring urban development around this supply and limiting car access to the city centre. The example of major urban areas in German-speaking Switzerland has been widely publicized in the media as a "best practice" by European urban transport professionals. This situation has encouraged the export of expertise and measures inspired by the Swiss model: numerous major cities and French, German, and Italian urban regions refer to it (for example, Grenoble, Strasbourg, and Orléans in France), relying on Swiss engineering and planning firms to apply these principles locally. However, these exports have often ended in failure, as not enough attention was paid to local differences in political opportunities and structures. It is also noteworthy that this model has not yet been successfully exported to other Swiss cities such as Geneva and Lausanne, for similar reasons.

Rather than addressing the question of transferability, which would require us to refer to normative models of urban planning and transport coherence, we have chosen to focus on public policy change. In each of the study sites, we identify the conditions that either prohibit or encourage change by altering how problems are formulated or how these two sectors of public action are coordinated. To do so, we have reconstituted these four cities' urban planning and transport policy trajectories over the last forty years. By trajectory, we mean the path taken through changes in these sectors' issues and orientations, organizational

mechanisms, procedures, and regulatory instruments, as well as the principle means employed at different spatial scales (from the centre city to the entire urban region.)
Recent work in the field of political science has underscored the importance of analyzing public policy changes over the long term. According to Fontaine and Hassenteufel (2002), this historic distance allows us to better describe changes by bringing out the inertial and continuity factors characteristic of public action processes, as well as interaction between the different decisional echelons, notably the local and national scales. This temporal perspective of analysis appears to be particularly appropriate for our problem, as the transport and urban planning coordination problem has persisted throughout the entire period, while referring to objectives and means of action that *a priori* (*i.e.* if we judge by the legal texts and administrative circulars which define them) have changed profoundly.
We have opted for the analytical framework referred to as the "three I's", which allows us to combine three complementary classic entry points for the analysis of public policies: Ideas, Institutions, and Interests, which are often approached independently of one another (Palier and Surel, 2005). *Ideas* refers to the intellectual dimension of public action: the values, beliefs, and norms which influence the formulation of problems and the choice of political solutions. *Institutional logic* refers to the manner in which formal action frameworks (laws, institutional organization, and procedures) influence the individual decisions. We attempt to identify the cumulative effects of these mechanisms and decisions. Finally, *Interests* refers to the strategic dimension of public action, that is to say, the manner in which actors formulate their objectives and their demands, negotiating representation and putting strategies into place to defend them. These three dimensions were first applied successively to the four study sites with no *a priori* hierarchy. Reconstructing the different phases of their urban trajectories then allowed us to show the dominant role of factors belonging to one or several of these three dimensions over each period. In this paper, we will concentrate on these local dynamics, which served as a basis for our comparative analysis.

3. IDEOLOGIES AND LOCAL TRADITIONS IN THE RELATIONSHIP BETWEEN THE CITY AND TRANSPORTATION

At first glance, these four urban areas' trajectories reveal coherent changes in the ideas, values, and norms underlying the logic of local urbanism and transport actions. In the movement from the automobile city toward the sustainable city, similarities in the arguments justifying the foundations of public intervention attest to the strength of certain general doctrines, which have spread widely through international professional circles. Nonetheless, a more in-depth analysis reveals a certain number of ideological differences between France and Switzerland, which have more or less pronounced effects at the local scale.

3.1. Visions of urbanity and territorial development

Urban planning and development policies in Switzerland and France refer to visions of the urban phenomenon that were initially quite divergent.

In Switzerland, the beginnings of urban planning were at first influenced by anti-urban ideologies, associated as much with moral considerations ("the city is bad for mankind") as a rejection of the political domination of the countryside by cities (Salomon Cavin, 2005). This reserved attitude of the Swiss Confederation toward the urban phenomenon can be interpreted, on the political front, as a result of federalist organization founded on the strict respect of cantonal autonomy. On the ideological side, we also find a clear influence from the ruralist doctrines characteristic of the first half of the 20th century (Walter, 1994) in the roots of planning policies. A federal law on the protection of agriculture was created in 1952. It refers to the principle of agricultural self-sufficiency, and helped agriculture take its place as a privileged sector of the economy after 1940. Up until very recently, neither planning policy nor regional policies supporting struggling territories took urban areas into account.

The rarity of land and the protection of agricultural spaces solidly imposed themselves as organizing principles in the domain of territorial development and planning, notably in the most confined spaces, like that of the canton of Geneva. The first cantonal master plans sought to densify urbanization within a central zone delimited by an agricultural green belt, which has been strictly protected since 1952. The effects of this protectionism on the coordination of urban planning and transport vary according to the time or urban area considered. Within the limited and densely populated territory of the Geneva canton, the accent was placed on the development of an intensive public transport network, and by 1925, the canton of Geneva thus possessed one of the densest tramway networks in Europe. Almost entirely dismantled in the 1950s to make space for the automobile, it has been replaced by a network of busses, trolleys and motor coaches that is equally effective. However, this strategy of densification and short-distance service was not accompanied by restrictions on car use as it was in Bern. On one hand, there exists an old but living tradition automobile use in Geneva, as evidenced by the physiognomy of the city and the polemics which even today enter into debates on the place of the car in the city. On the other hand, interurban accessibility to this internationally prominent financial centre is essentially provided by the road and motorway network rather than rail connections, which have long been judged unnecessary to the canton's functioning. Nevertheless, increases in cross-border travel over the last two decades tend to challenge this original "dense automobile city" model, as much of Geneva's periphery lies outside the canton in France.

In France, urban questions are an essential part of the national territorial development policy, which was put in place in the 1960s. Here the major issue was not limited available land, but rather the balance between major urban areas and the redistribution of economic growth. This vision is based on both Malthusian principles concerning the growth of the Parisian region and the desire to support the development and equipment of major towns outside the capital. The urban planning and development schemes (SDAU) of the 1970s and the "new towns", which were intended to polarize peripheral urban development, employed a very hierarchical approach to urban structure. Urban planning was also dominated by a functionalist approach, relying on zoning and the principle of hierarchy in traffic flows.

In urban planning practices in Strasbourg and Bordeaux, we see both the influence of these national planning doctrines and nuances in their local implementation. During the 1960s and 70s, planning documents and decisions regarding transport infrastructure in the Strasbourg area reveal two opposing views on the relationship between the city and transportation. The

first, which was based on traffic model and accessibility experiments carried out by transport engineers in cooperation with the Transport Ministry, evaluated the need for transportation (primarily road) infrastructure based on projected urban growth. The second, developed within the planning services of the city of Strasbourg, is coherent with local urban history and its German heritage. It refers to a culturalist vision of planning which is particularly attached to the defence of architectural heritage and a clear distinction between urban and rural environments.

3.2. The weight of ecology

The idea that the success of transport/urbanism coordination strategies can be explained by the strong ecological sensibility of the Swiss is fairly common. However, an analysis of our four urban areas' trajectories requires us to nuance this argument.

In Switzerland, environmental awareness emerged on the national political scene at the beginning of the 1980s, in the context of "acid rain" episodes that were widely covered by the media, provoking a special session of the Helvetic Confederation's parliament. This preoccupation continues an existing tradition of landscape conservation born out of the confrontation between the two (aesthetic and economic) functions of nature, and a desire to identify the homeland with the alpine landscape (Walter, 2005). The consequences of the environment's appearance in the transportation and urban planning fields are twofold: first, the adoption of the RAIL 2000 project, which sought to develop an supply of intermodal, well-connected public transport, and did in fact lead to a rebirth of rail policy; second, the definition of noise and pollution norms in the environmental protection law of 1983, which limited urban development in zones exceeding certain thresholds. In Geneva and Bern, ecological associations mobilized on essentially two fronts: first, they defended strict landscape conservation and the respect of noise and pollution norms, which led to the definition of drastic criteria on roadway location; second, they pushed for the development of public transport.

In France, environmental protection was taken into account much later by the urban and transport planning fields, at least on the national scale. The text of the 1996 law on "air and the rational use of energy" addresses environmental concerns almost exclusively through modal shift from the car toward public transport, walking, and the bicycle. Openness to environmental problems varied from one place to another, but was rarely focussed on urban and travel questions. In the 1970s in Strasbourg, the strongest movements addressed national or regional issues such as nuclear power and industrial development along the Rhine in the greater Strasbourg region. In Bordeaux, it was not until the conflict surrounding the VAL automated metro project in the 1980s that ecologists turned toward transportation and took an active part in debates. Nevertheless, the battle was less about modal shift or urban structure issues than financial costs. With the creation of a Green Plan for Strasbourg in 1974, which sought to improve a system of green spaces within the urban area, ecology advanced into the field of urban planning in a way that was original (this process had no equivalent in France at the time) but restricted. The relative disconnect between urban and ecological issues limited public intervention to a few isolated cases geographically targeted on centre cities, which were subject to the most important degradation.

Though the weight of environmental questions in the promotion of alternative modes to the private car seems indisputable, its role in the implementation of urban planning-transport coordination policies seems more ambiguous. An analysis of the urban travel plans (PDU) required by the Air Law in France has already pointed out how weak local interpretations of the new public action referential, *i.e.* urban air quality and the rational use of energy, can be (Offner, 2003). This lack of coordination is likely due in part to the important role played by zones (agricultural or natural zones, risk zones) in classic environmental protection policy, which is somewhat incompatible with reticular (*i.e.* network-oriented) urban planning. For example, applying noise and pollution standards to construction in Swiss urban areas often meant paradoxically locating noisy or polluting industrial activities far from residential zones. In order to avoid this sort of effect, the Bern canton recently created a "travel weighting" criterion, which takes the traffic generated by new industry into account for location choice.

4. COORDINATION AND INSTITUTIONAL FRAMEWORKS: BETWEEN FLEXIBILITY AND INERTIA

The creation of integrated authorities, acting within a jurisdiction considered "pertinent" for problems regarding the development, organization, and attractiveness of major urban areas is often presented as an essential prerequisite for coordinated urban policy. We have found the comparison of Switzerland (a federal state) and France (a nation-state that has progressively decentralized power) to be particularly useful in testing such an assertion. Here we present two specific results of this comparison.

4.1. The existence of an integrated transport and urban planning authority is not sufficient to set coordinated policies into action

This observation principally concerns the two French urban areas, Strasbourg and Bordeaux, which were given the status of Urban Communities (*communautés urbaines*) by the State at the end of the 1960s. Despite the resultant cooperative, integrated inter-municipal structures, there has been no real coordination of transport and urban planning policies at a regional scale. The municipalities retained most decisional power in urban planning, while the regional institution served to develop urban transportation services and manage a certain number of major roadways. Parking and local roadway maintenance are generally municipal responsibilities. This geographic and technical separation of responsibility has been strengthened by local elected officials' resistance to the creation of cooperative structures, which were imposed by the State. In both cases, a political pact founded on the principle of non-interference by the Urban Community in municipal affairs has managed to neutralize any requirements for cooperation. This kind of consensual operation yields an absence of planning priorities at the regional scale.

In Strasbourg in particular, the defence of municipal prerogatives was for a long time reinforced by a desire to maintain an exceptional construction law regime inherited from German law, in which the Mayor of the centre city has quasi-monarchic power. Pierre Pfimlin, president of the Urban Community and mayor of Strasbourg until 1983, was strictly opposed

to the replacement of these unique municipal construction laws by common law. Strasbourg's land use plan (POS) procedure was launched immediately after the approval of the master plan in 1973, but took nearly twenty years to complete. The process was hijacked in various ways, even leading to convictions in the administrative courts. At the beginning of the 1990s a municipal team led by Catherine Trautmann re-launched planning procedures and finally secured rapid approval of the POS, without which it would have been impossible to construct the new tramway. Despite this step toward coordination, the Urban Community, though legally responsible for elaborating a collective Local Urban Plan, continues to delegate this task to the 27 member municipalities. Though the tramway is indeed an inter-municipal project intended to improve accessibility for the entire Strasbourg region, it is not connected to a shared urban development project at the overall Urban Community scale.

In the case of Geneva, segmentation of responsibilities is also quite visible, but unlike the two French study areas, this fragmentation is less geographic than technical. In fact, the canton of Geneva is one off the Swiss cantons where municipal autonomy is the weakest, and municipal influence on urban planning and transportation is quite limited. Because of its limited territory, the cantonal institution got involved very early in the field of territorial development, concentrating all planning and transportation functions at its level. Several master plans have been created since the 1950s, even before the Helvetic Confederation made this a legal obligation in its 1979 law on territorial development (LAT). Despite this technical and geographic integration, procedures and projects were increasingly sectorialized over the course of the 1980s, particularly in the transportation field. A revival of traffic and modal shift policy in the canton of Geneva at the beginning of the 1990s (Circulation 2000) made no reference to urban planning problems. From this time forward, transportation and land use plans, which were previously both part of the cantonal master plan, were created separately (Kaufmann, Säger, Ferrari and Joye, 2003).

4.2. Coordinated transport and urban planning policy can emerge in the absence of integrated regional-scale institutions

As in most other Swiss cantons, municipal autonomy is more pronounced in the canton of Bern than in that of Geneva: municipalities are responsible for territorial development, as well as the organization of urban transport and parking. The canton of Bern is also unique in that it includes several development regions, which emerged in the 1970s as communal associations involving almost every municipality in the canton. The Bern urban region association of municipalities, which adopted the name Verein Region Bern (VRB) in 1991, saw its prerogatives progressively extended over this period. Nevertheless, institutional reform giving the association greater power to address regional development problems was not begun until the 1990s, without changing the principles of free association and municipal autonomy. Any attempts to do otherwise were immediately met with strong opposition from citizens and elected officials. At the same time, following the 1993 law on public transport, the canton of Bern launched regional transport conferences in order to improve public transport supply coherence at different scales, and encourage coordination between public and private transport. The Bern Transport Conference (RVK4) was created in 1994 and includes 89 municipalities.

Integrative institutional reform thus appeared after coordination, which emerged in the 1980s in both planning practices (at the regional and cantonal scales) and the outlining of projects. In Bern, the progressive institutionalization of land use-transport coordination was the result of a compromise between the effectiveness of structures and the defence of local democracy. In fact, any increase in regional power was systematically checked by the introduction of citizen participation rights and the retention of municipal independence. Direct democracy in Bern is characterized by great flexibility, as demonstrated by the existence of ad-hoc commissions and upstream concertation on development projects (Kaufmann, Säger, Ferrari, and Joye, 2003). This flexibility contrasts with the permanent consultative commissions that intervene in urban planning and transport questions in the canton of Geneva. Their role seems to be more in assuring the legitimacy of cantonal policy (warning of often virulent opposition and the possibility that cantonal decisions will fail when faced with grass-roots opposition) than the elaboration or negotiation of its goals.

5. CONFLICT, NEGOTIATIONS, AND COMPROMISES AROUND THE CITY-TRANSPORT CONNECTION

Seen from the perspective of individual and institutional strategies, the coordination of urban planning and transport involves tensions, misalignments, and conflicts of interest that characterize the coexistence and joint development of transport networks, travel flows, and urbanization. From this perspective, we see coordination as local actors' attempts or strategies to regulate these mismatches, tensions, and conflicts.
Beginning with the classic opposition between two visions of urban production, that which privileges centrality (the *areolar* approach) and that which accentuates the development of networks (the *reticular* approach), we first seek to identify which kind of interests refer to each of these conceptions, and to understand their role in the evolving relationship between the city and transport. Next we will question the weight that economic reasoning carries in the process of land use and transport policy coordination.

5.1. Networks vs. territories?

The development of networks and the diversification of mobility brought political-administrative boundaries into question, threatening to dispossess political powers whose legitimacy was built on a delimited territory (Offner, 2000). How then was coordination established between urban planning, whose approach remained fundamentally forged by the *areolar* vision of territories, *i.e.* that defined by zones and borders, and transport planning, which refers to the *reticular* approach in which networks and flows constitute the urban?
In questioning the importance of an approach "which relegates networks to the subaltern function of circulatory technology" within the field of urban planning, Gabriel Dupuy (1991) returns to the emergence of urban planning practices at the end of the 19th century, when urbanists' desire for reform ran up against opposition from landed property owners, who were careful to preserve as much of their land rent as possible (Gaudin, 1989). In this context, zoning gradually appeared as a means to justify public action and clarify the rules for

landowners. Expropriation through zones allowed both real estate prices and housing densities to be controlled. In other words, the *areolar* and *reticular* points of view correspond to somewhat antagonistic interests which, in different periods and under different degrees of tension and discord, resulted in either the reinforcement of border logic or the networking of territorial interests.

Two of our case studies show the importance of conflicts between these two perspectives in the production of urban planning practices. These conflicts of interest affect both how problems are formulated and how concrete solutions are implemented, for both integrated technical solutions and cooperative practices.

For example, the 1975 plan to create a pedestrian-only area and a tramway in the centre of Strasbourg was the result of a compromise between the political vision of the municipal administration, which was motivated by the defence of architectural heritage and the re-conquest of central public space, and the objectives of national technical authorities, which were expressed in terms of road accessibility improvement. Despite the fact that this project was postponed for political and economic reasons (poor acceptance of the tramway, a temporary reduction in State transport subsidies, and the business owners' hostility toward eliminating automobile traffic from the centre), it was a major step forward in the local consideration of urban planning and transport interaction. At the beginning of the 1990s, the tramway project was re-launched using almost exactly the same right of way that was defined at the beginning of the 1980s.

Urban planning and transport coordination strategy in the canton and urban region of Bern is particularly interesting. It is the result of a process composed of sequences in which different spatial interactions follow or coexist with one another. Local actors readily declare that spatial planning and transport have been coordinated for thirty years in Bern. The history of local policies shows on the contrary that coordination was an ongoing and conflictual process. It seems that the memory of this process has faded with time, aided by simplifications accompanying the spread of the "Bern model" in technical circles. The reconciliation of transport and urban planning objectives was the result of progressive changes in scale, from the centre city to the urban region to the canton. The level of coordination varied over both time and space: all actors did not participate in each step, and initial participation by the canton was weak, for example. The defence of urban quality of life against an automobile invasion at first appeared as an objective serving the interests of certain inhabitants of the centre city; in a second act this objective was re-appropriated by Bern elected officials and became a means to attenuate the outflow of inhabitants towards the periphery, thereby regulating growth in commuter flows.

5.2. The economic logic of territorial dialogue

History shows that economic reasoning carried significant weight in the development of urban technical networks, whose emergence owes much to private interests and initiative. In fact, these networks first extended their reach wherever "demand was solvent" (Dupuy, 1991). Urban landowners were generally opposed to their extension elsewhere, where these networks might induce new urbanization and create real estate value. This close correlation

between network development and urban density explains why networks initially had minimal impact on urban morphology.
The rise of individual motorization in the 1950s spread access to urban road networks and thus accelerated metropolitan areas' changes in scale. Improved travel conditions altered the trade-offs made by individuals, households, and businesses by greatly increasing their opportunities within urban space, both in terms of real estate and workplace or activity choices. By weakening proximity constraints, increases in speed became an essential factor in the peri-urbanisation of habitat and activities (Wiel, 2002). Depending on context and time period, different lines of economic reasoning either sustained or slowed down the resultant expansion and fragmentation of cities.

(i) Centre-periphery negotiations addressing urban sprawl

Though this is not its only cause, peri-urbanisation is the result of a centrifugal movement that spreads inhabitants out from the centre toward the periphery. Certain centre cities lost a non-negligible part of their residents very early on, before public policy promoting individual home ownership (especially in France) encouraged households to choose peripheral locations. This is the case in Bordeaux and Bern. This movement was not limited to less wealthy households who could not find a home in the centre that was compatible with their financial situation. Living conditions in the centre were worsening, either due to the concentration of living space in deteriorating older buildings (in Bordeaux) or increasing automobile traffic nuisances (in Bern); thus even wealthy urban households aspired to live in detached homes in the urban periphery. When faced with the departure of numerous solvent households and increased motor traffic flows converging on the centre, municipalities adopted varying strategies.
In Bern, residential peri-urbanization is considered to be an aggravating factor in the saturation of major road axes. The necessity of regulating commuter flow increases to respect limitations on automobile access to the centre led the municipality to begin an urban planning dialogue with the periphery. Two kinds of interests motivated the progressive reinforcement of municipal alliances within the Bern Region (VRB): on one hand, negotiations between the centre and the periphery attempted to moderately disperse employment and share the cost of public transport network development; on the other hand, there was a need to argue in favour of the Bern region's subsidy requests to the canton and the federal government, who did not consider urban areas to be a priority for intervention until the 1990s.
The situation was entirely different in the Bordeaux region. Bordeaux is at the core of an Urban Community that it does not dominate in terms of population or economic weight, and was forced to compromise with the demands of its periphery. The political equilibrium between the central municipality, controlled by the Right, and its powerful neighbours, several of which were governed by Socialists, was periodically re-negotiated. This balance depended on the redistribution of communal resources in favour of peripheral municipalities. Within this logic, it is impossible to prioritize action; domination by local interests overpowers any reasoned and collective approach to urban development as each municipality demands to be connected to the network. The public transport network thus lacks a structural axis and

has a large number of stops. It is quite spread-out and inefficient, and particularly expensive for the Urban Community. This power struggle is also apparent in the series of standstills that punctuated the construction of the Bordeaux motorway bypass. Most of the municipalities through which the bypass runs were initially opposed to the project, but eventually ended up requesting a local access interchange. Thus, the initial function of the infrastructure (bypassing through traffic around Bordeaux) was forgotten, and it became an effective basis for urban sprawl.

(ii) The special case of cross-border territories

The case of urban regions that span borders is unique in that salary, tax, and land price differentials have a direct impact on commuting flows, the formation of interest groups, and the kinds of confrontation that emerge between them.
From the point of view of city-transport coherence, the weight of economic reasoning appears to be relatively weak in the construction of a cross-border cooperation between the Strasbourg urban area and Kreis d'Orteneau, compared to what we observe in the Franco-Swiss case of Geneva. The recent arrival of the TGV high speed train line in Strasbourg reinforces the priority accorded to interurban connection projects: it is at this scale, more than that of the cross-border employment basin, that State subsidy requests are focussed. This follows from rhetoric that emphasizes Strasbourg's position as a "European crossroads", referring to its role as the political capital of the European Union (Ollivier-Trigalo, 2007).
In Geneva, urban spatial and travel questions are quite present in the history of relationships between Swiss and French municipalities. Growing dysfunction in Geneva's transport system oriented cantonal priorities toward the improvement of public transport during the 1980s, and was an integral part of establishing the cross-border scale of the Geneva metropolitan area.
Since the end of the 1980s, the acceleration of urban sprawl has been accompanied by a strong increase in commuting flows between Switzerland and France, and pushed Geneva's access roadways to saturation. The creation of a heavy rail public transport system between Switzerland and France thus became a particularly pressing issue, and was integrated into the project to create a regional express network in the 1990s. A new actor called Transborder Economic and Social Coordination (CEST) intervened on the local scene, and was decisive in initiating Franco-Swiss negotiations on the implementation of cross-border public transit service. This organization, which sought to encourage concertation between labour unions on either side of the national border, defended the specific interests of cross-border workers according to a reticular logic, attempting to lessen the hermetic character of national borders. Despite effective mediation, negotiations between the canton of Geneva and the municipalities of the Annemasse urban area stalled when both parties refused to finance the line. In 1992, Switzerland's referendum decision against European Union membership accelerated cross-border cooperation. However, it was not until the beginning of the 2000s that the rail line project between Geneva and Annemasse (CEVA) was re-launched.
We can conclude that strategic territorial planning efforts undertaken over the last ten years probably demonstrate a common desire of Swiss and French authorities to advance cross-border cooperation. The interplay of interests is shifting, and French municipalities are asking

that employment opportunities spread to their territory in exchange for contributions to public transport supply improvement. However, the brusqueness with which the canton of Geneva has taken the initiative on the CEVA project does not facilitate negotiations. Discussions involve the Rhône-Alpes Region and the French State rather than the French municipalities, which do not have decisional power over rail services. When faced with French hesitation to participate in financing, the Geneva canton recently threatened to stop contributing to the "Geneva fund"[4]. Thus it seems that the future of CEVA, a spearhead of cross-border development policy, is not entirely sealed.

(iii) Urban expansion: can the urban planning/transportation relationship be inverted?

In recent years, the principle of preferentially urbanizing areas that are well served by public transport appeared as a means to simultaneously manage peri-urbanisation and regulate the demand for automobile travel. This design inverts the classic algorithm for action, in which infrastructure needs are predicted based on existing or projected urbanisation. It differs from traditional economic logic, which tends to develop networks in already-urbanized areas, and often the densest ones.

Though there seems to be almost unanimous support for this principle among transport and urban planning professionals, and it seems to be spreading among a growing number of local elected officials as well, there are two major factors that limit its implementation. In areas already served by public transport, the capacity for increased urbanization is generally fairly limited, and densification projects generally run up against opposition from neighbours and their elected representatives. Elsewhere, public transport service must be extended into areas that are not yet urbanized, and these services are initially not profitable. The success of such a strategy requires tight spatio-temporal coordination of transport and urban planning policies, through mechanisms like the "economic development poles" (PDE) created by the canton of Bern. There, construction of a regional express network (S-Bahn) at the beginning of the 1990s was undertaken as part of the "Rail 2000" renewal policy put in place by the Helvetic Confederation in 1985. A few years before trains began running, the S-Bahn was integrated into the PDE project framework, as a result of the canton of Bern's lack of suitable spaces for business and industry in areas well served by public transport. In other words, the regional express network was first developed as a means to improve rail service at the interurban scale, and later integrated into urban expansion plans.

In other urban areas where regional rail service is much less developed, the high cost of increasing public transport supply of before urbanization takes place makes implementing such a strategy problematic. There is also little capacity for public intervention in industrial location choice. Therefore, coherence between urban and transport planning is essentially sought in the relationship between housing development and public transport service. In the

[4] The Geneva Fund was established in the 1970s by negotiations between the French State, the local French municipalities, and the canton of Geneva. French municipalities close to the Swiss border were facing an influx of cross-border workers residing in France, and asked that the canton of Geneva finance public amenities. The Geneva Fund is financed at the rate of 3.5% of the total salary of French cross-border workers. It is managed by a consultative commission including elected officials from Geneva's State Council, as well as representatives of the French national and Swiss federal administrations.

absence of proactive real estate policies, opportunities for a "return on investment" through transit network induced price increases remain limited, though this argument has been used by Federal Council members from Geneva in an attempt to convince Federal representatives that the CEVA project would be profitable for the Geneva canton. Thus, the Bern example suggests that despite the important role of economic logic in transport/urban planning integration, political arbitration still carries significant weight.

CONCLUSION

Based on this comparative analysis, what can we say about changes in the concepts and methods behind the coordination of local urban planning and transport policy?

On the level of the ideas and values underlying changes in the relationship between the city and transportation, these four case studies show both a convergence of dominant doctrines among urban planning and transport professionals, and the existence of ideological differences on issues of territorial development and transportation, based on different views of the urban phenomenon and different degrees of ecological sensibility. First and foremost, this study underscores the fact that local interpretations of general policies are diverse, and that priorities and action strategies follow local political and cultural traditions. For example, certain metropolitan areas like Geneva anticipated territorial planning and development mechanisms later imposed by the Helvetic Confederation because of particular topographic constraints. In Bern, the beginnings of urban policy change and the first measures restricting car access to the city centre also predate the rise of environmental concerns at the national level. But in the latter case, it appears to be political opposition to an infrastructure project that was decisive, with site constraints later confirming the necessity of a rigorous linkage between transport and urban planning policy.

These various observations confirm the notion that a strong interdependence exists between the dimensions of knowledge (ideas) and power (interests and institutions) in the elaboration and implementation of local policies. According to this hypothesis, which is foundational in cognitive approaches to public policy (Muller, 2000), the manner in which an idea imposes itself in the political domain depends on the concrete conditions under which power is exercised.

Our analysis of urban planning and transport policy coordination methods also yields two different lessons.

First, a look at local policies reveals that practices allying these two sectors are diverse. Coordination takes place where we do not expect it, outside purpose-built frameworks, as suggested by a comparison of local organizational dynamics. Though this observation implies that the weight of institutions as means for political change is relative, it does not deny their influence on the structure of local individual action. The specificity of the observed policies, the manner in which they insert infrastructures in the urban landscape over the long term, the frequent emphasis placed on networks in the governance of urban territories, are all facets of this institutional continuity. However, in the domain of institutional reform, it is less urgent to invent new structures that are "coherent by design" than to reflect on the capacity for change in existing institutions and ways in which they can cooperate.

Second, an examination of actors' capacity for negotiation and compromise reveals that temporal and spatial misalignment is a central issue in the comprehension and management of urban space. Ideals of land use-transport coherence are static, unlike the reality of urban policy, which is characterized by a lack of synchronization between network development and urban growth, constant misalignment between existing infrastructures and their uses, and actions situated within a history (Scherrer, 2004). Transport and urban planning policies are strongly influenced by the weight of past decisions, which can prohibit local strategies from immediately adjusting to strategic changes in direction. Bern's trajectory reminds us that sectorial integration is the result of a long, conflictual process, even if this fact has been forgotten locally. The issues of spatial planning and mobility regulation were a continuous source of political tension, particularly at the moment when the Helvetic Confederation decided to accord more weight to urban problems. Coordination is the result of confrontations between the *areolar* and *reticular* views of urban development, within an adaptive process that follows a constantly moving target.

These results encourage us to imagine political change differently, moving beyond the incantatory consensual statement that better urban planning/transport coordination is necessary.

Recent research on local planning processes has underscored the difficulty of renewing cognitive frameworks on the relationship between the city and transport through the idea of sustainable development, evoking a crisis in expertise or the lack of territorial anchorage for issues formulated at a global or intergenerational scale (Paulhiac, 2005). The difficulty of this paradigm transformation also attests to the fact that tensions and conflicts around the question of regulating spatial mobility are alive and well. The legitimacy of local transport and urban planning policy depends on several coexisting registers: the necessity of metropolitan competitiveness, environmental protection, and the struggle for social justice. This multiplicity of referentials makes debates over the objectives and means of spatial mobility management far from clear-cut. Thus, this double conceptual and political crisis invites us to step back from traditional images of transport/urbanism coherence focussed on the relationship between (public) transport and land use, and reflect on fields of urban public action, such as housing policy.

However, our case studies confirm that strong sectorial segmentation continues, even within the transport sector. Today, the idea of city/transport coherence is primarily concerned with the relationship between urbanization and public transport network development, and tends to ignore the question of development around roads. Road infrastructure construction, if not dressed up in environmental virtue (*cf.* discourse on the "anti-asphyxiant" virtues of large bypass motorways), can be a genuinely 'taboo' subject. Urban sprawl may indeed be the antithesis of the sustainable city, but this does not make it any less a reality in many countries. By giving excessive priority to the search for structural solutions to environmental risks, urban thought may neglect the essential question of peri-urban territories and their inhabitants' capacity for adaptation.

REFRENCES

Apel Dieter, Pharoah Tim, Transport Concepts in European Cities, Avebury Studies in Green Research, Aldershot, 1995.

Brög Werner, Erl Erhardt, Raux Charles, Jones Peter, Introduction, in Réduire ou repenser la mobilité urbaine quotidienne ?, Table Ronde de la Conférence Européenne MT n°102, Conférence Européenne des Ministres de Transports, 1996.

Dupuy Gabriel, L'urbanisme des réseaux, Armand Colin, 1991.

Fontaine Joseph et Hassenteufel Patrick, Quelle sociologie du changement dans l'action publique ? Retour au terrain et refroidissement théorique, in To change or not to change ? Les changements de l'action publique à l'épreuve du terrain, sous la direction de Joseph Fontaine et Patrick Hassenteufel, Rennes, PUR, 9-29, 2002.

Gallez Caroline et Kaufmann Vincent (dir), Mythes et pratiques de la coordination urbanisme-transport, Regards croisés sur les trajectoires de quatre agglomerations suisses et françaises, Rapport de recherche INRETS, à paraître en 2010.

Gaudin Jean-Pierre, La genèse de l'urbanisme de plan et la question de la modernisation politique, Revue Française de Science Politique, vol. 39, n°3, 296-313, 1989.

Jemelin Christophe, Kaufmann Vincent, Barbey Julie, Klein Tina, Pini Giuseppe, Politique de transport et inégalités sociales d'accès. Analyse comparative de huit agglomérations européennes, Lausanne, EPFL, 2007.

Kaufmann Vincent, Sager Fritz, Ferrari Yves, Joye Dominique, Coordonner transports et urbanisme, Lausanne, Presses polytechniques et universitaires romandes, 2003.

Kay Adrian, A critique of the use of path dependency in policy studies, Public Administration, Vol. 83, n°3, pp. 553-571, 2005.

Muller Pierre, L'analyse cognitive des politiques publiques : vers une sociologie politique de l'action publique, Revue française de science politique, vol. 50, n°2, 2000, 189-208.

Offner Jean-Marc, Les Plans de déplacements urbains (1996-2002), in Denise Pumain et Marie-Flore Mattei (eds), Données urbaines, t.4, Paris, Anthropos, 2003, 379-386.

Offner Jean-Marc, Les « effets structurants » du transport : mythe politique, mystification scientifique, L'Espace géographique, n°3, 233-242, 1993.

Offner Jean-Marc, Territorial 'deregulation' : local authorities at risk from technical networks, International Journal of Urban and Regional Research, 24-1, 165-181, 2000.

Offner Jean-Marc et Ollivier-Trigalo Marianne, Introduction, COST 332 Transport and Land-Use Policies : Innovations in Institutional Arrangements for Co-ordination, Final Report, European Commission, DG for Energy and Transport, 2000.

Ollivier-Trigalo Marianne, Les transports en régions : doctrines, action collective et leadership, in Six Régions à l'épreuve des politiques de transport. Décentralisation, régionalisation ferroviaire et différenciation territoriale, sous la direction de Marianne Ollivier-Trigalo, Synthèse INRETS n°55, 41-53, 2007.

Palier Bruno et Surel Yves, Les « trois i » et l'analyse de l'État en action, Revue Française de Science Politique, vol. 55, n°1, 7-32, 2005.

Paulhiac Florence, Mobilités urbaines à Montréal. Du renouvellement de l'action publique à la pérennité du référentiel techniciste, Lausanne, EPFL-LASUR, Cahier du LaSUR, n°6, 2005.

Scherrer Franck, Désynchroniser, resynchroniser, in Les rythmes urbains, sous la direction de Bernard Lamizet, Lyon, Musée Gadagne, 45-53, 2004.

Salomon Cavin Joëlle, La ville mal aimée, PPUR, Lausanne, 2005.

Schuler Martin, Perlik Manfred et Dessemontet Pierre, Agglomérations et aires urbaines dans l'espace transfrontalier Ain – Haute-Savoie – Genève – Vaud, Observatoire statistique transfrontalier, fiche 09, 2005.

Wachter Serge, La forme et le flux. Figures urbaines et architectures de la mobilité, Note du centre de prospective et de veille scientifique, n°18, MELT, mars 2003.

Walter François, La montagne alpine : un dispositif esthétique et idéologique à l'échelle de l'Europe, Revue d'histoire moderne et contemporaine, 52-2, 64-87, avril-juin 2005.

Walter François, La Suisse urbaine, 1750-1950, Carouge-Genève, Zoé, 1994.

Wiel Marc, Ville et automobile, Descartes et Cie, 2002.